

Women in IEEE PELS: Learning From the Past, Defining the Future

Impact of Gender Diversity

The importance of Diversity and Inclusion (D&I) in the workforce has been a broad topic in industrial and academic research for many years. A quick review of major publications, such as Harvard Business Review, yields tomes of critical research on the importance of diversity. While there is research regarding nearly every aspect of why D&I is important for every organization, here are just a few highlights:

- Companies with increased gender diversity are 25% more likely to experience above-average profitability than their less diverse counterparts. A number which has increased by 10% since initial data analysis in 2014 [1].
- More representation matters. Companies with >30% women on their executive teams are more likely to outperform their less gender-diverse counterparts by up to 48% [1].
- To inspire action in an organization, it is critical to consistently track and publish diversity data over time and with relevant comparisons. Setting and tracking progress towards diversity goals are fundamental to support change [2].

Recently, the IEEE Power Electronics Society (PELS) Women in

Engineering (WIE) Committee [3] started tracking the visibility and representation of women in PELS membership, positions of leadership, and recognitions for various activities, including PELS awards and IEEE Fellow elevations. This article will present the diversity trends within PELS, as well as initiatives undertaken this year, and shows how you can contribute to increasing the D&I in our society.

For representation and gender identity, this article uses male and female terms to match the current self-reported gender identity statistics available within IEEE. However, inclusive language to support all gender identities is currently being implemented across IEEE and PELS. The scope of diversity and inclusion is a multi-faceted concept that is much larger than gender identity; measuring gender equity is one metric and aspect within the greater D&I conversation. IEEE PELS WIE has historically focused on the representation of women in IEEE, but the committee's goal is to promote and help shape the society to be an inclusive environment for everyone—regardless of their gender identity.

D&I Strategy and Tactics in PELS' Five-Year Strategic Plan

As part of its strategic plan for 2021 to 2025, PELS has included D&I as a core value to PELS operations—from the regional level up to the leadership [4].

One specific target is to grow the membership of women by at least 8%, using 2020 as a baseline (from 981 to at least 1,060 women members). Another stated goal is to ensure that PELS is culturally aware and sensitive to the many facets of D&I practices by not only relying on committee like PELS WIE, but to integrate these practices into membership recruitment, member services, and chapter/board leadership cultivation. The first step is to regularly track D&I metrics to be able to determine the efficacy of initiatives, and the second step is to adapt existing or create new initiatives to achieve our goal. Targets for this year are discussed in the subsequent sections.

Representation of Women in IEEE PELS—Statistics

Analyzing IEEE's membership data provides important insight regarding the historical and present representation of women within PELS. For the decade of 2010 to 2020, gender statistics for IEEE and society membership, PELS Administrative Committee (AdCom) members, PELS awards, and Fellows elevated by PELS are discussed in this section. Figure 1 shows the overall percentage of women represented within all of IEEE and PELS [5]. In order to provide a comparative baseline of gender representation, membership data of other similar IEEE technical societies are also provided for comparison; selected societies

include: Industry Applications Society (IAS), Power & Energy Society (PES), and Electron Devices Society (EDS). IEEE overall, as well as each of the individually reviewed societies, have generally increased the representation of women since 2013. PELS and EDS have been consistently trending below IEEE membership during the decade under analysis. Conversely, IAS and PES have reached parity or exceeded the IEEE trends since 2017. Note that membership numbers are based on self-reported gender, so women who did not report their gender are not captured. Still, this data provides a baseline for comparison, as the society targets gender equity in leadership positions and receiving recognition from PELS. Ideally, gender diversity within leadership and awards should meet at least the baseline of PELS membership diversity, if not that for IEEE overall.

With a baseline for overall representation, next we will evaluate the

visibility of women members within PELS. Figure 2 shows the representation of women as voting members of the PELS AdCom, which is the leadership and governing board for the society. The members develop strategies, propose new initiatives, and vote on major decisions that aim to strengthen

en and grow PELS. Over the last 10 years, PELS has had strong representation of women on the AdCom, exceeding the percentage of women PELS members since 2011, and sometimes exceeding that of women IEEE membership. While this is generally a positive indicator, it is important to

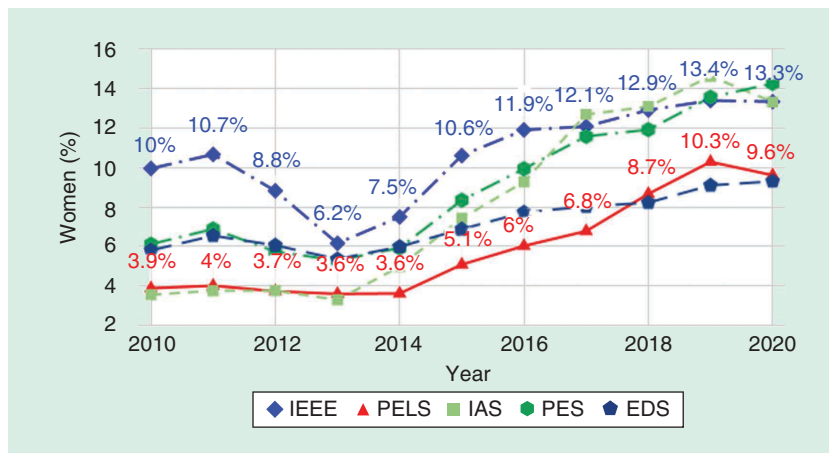
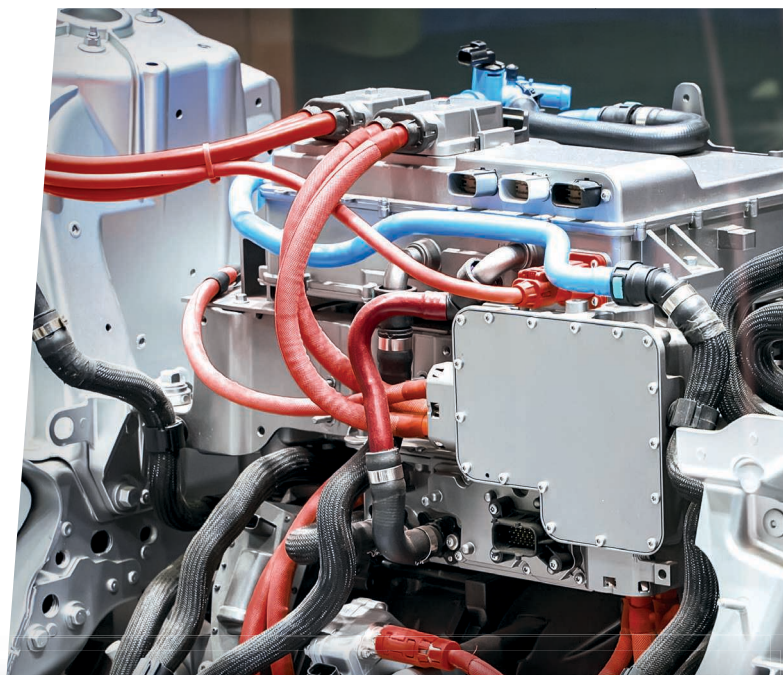


FIG 1 Percentage of women members in IEEE, PELS, and its sister societies, from 2010 to 2020. (Source: IEEE.)

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note that from 2010 to 2020, all women were elected Members-At-Large and no woman has yet been elected to the position of Vice President (VP) or

President, although there have been some women candidates for the position of VP. By comparison, in 2021, PES has a woman serving in the pres-

ident-elect position and there are two VPs out of seven. Similarly, IAS website shows two women out of ten as Technical Department Chairs and none as society officers. While EDS shows no women on its executive committee.

In terms of the awards sponsored by PELS, Figure 3 shows the percentage of women awardees from 2010 to 2020. Each of the nonzero values represents one woman receiving an award in that year; the percentage decreases over time because the number of annual awards has increased. In total, 4 women have received PELS awards, which is equivalent to 3.6% of the awards from 2010 to 2020, and only 2.0% of awards since 1977 when the first PELS award was established. These numbers are well below the PELS membership baseline, indicating that recognition of women members through awards is a critical area that needs improvement to reflect the core value of inclusive society recognition.

Elevation of members to IEEE Fellow is another important measure of recognizing one's professional achievements. The initial evaluation for Fellow takes place at the society level and the final evaluation occurs at the IEEE level. Figure 4 shows the percentage of women Fellows elevated through PELS compared to that for all of IEEE. Out of over 65 elevated PELS Fellows since 2010, only two were women, both elevated in 2018. Overall, the number of women being elevated to Fellow through PELS is considerably lower than that of IEEE, indicating that Fellow nomination and elevation is another area which needs to be improved.

There are several key points to emphasize from these statistics. First, the representation of women members in IEEE, PELS and all societies has been steadily increasing since 2013. Despite this increase, women were still underrepresented in 2020, representing only 10% of PELS, and below that of IEEE's membership of 13%. This indicates that more effort is needed to move

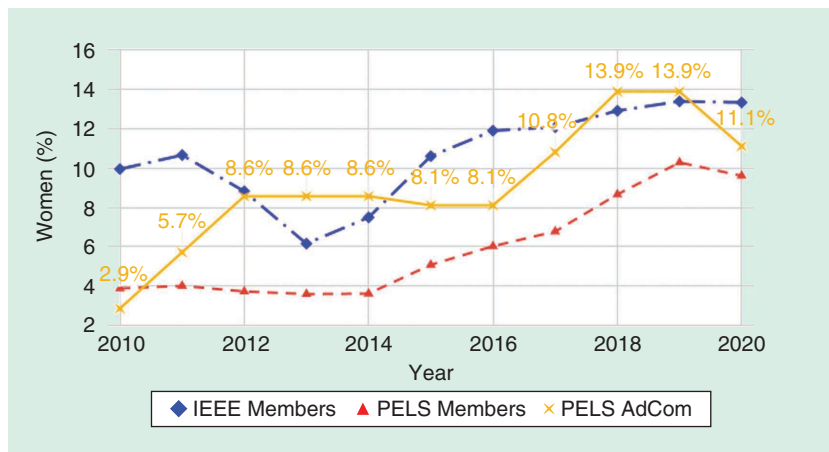


FIG 2 Percentage of women voting members of PELS AdCom from 2010 to 2020. (Source: IEEE PELS.)

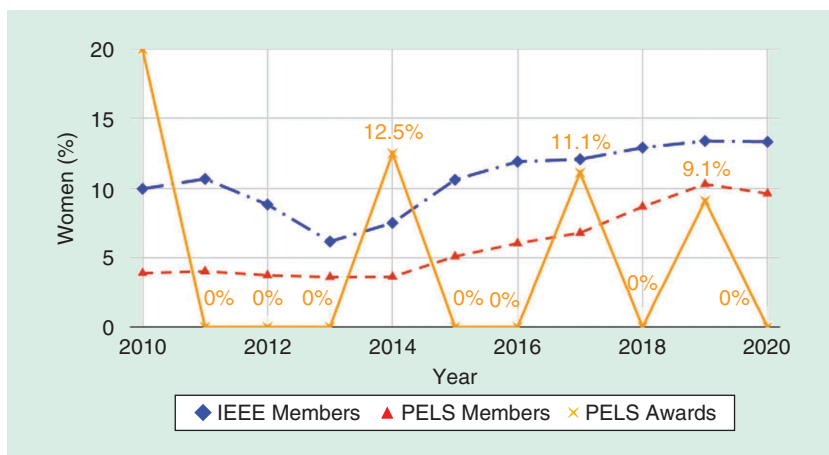


FIG 3 Percentage of women awarded PELS sponsored awards during the decade of 2010 to 2020. (Source: IEEE PELS.)

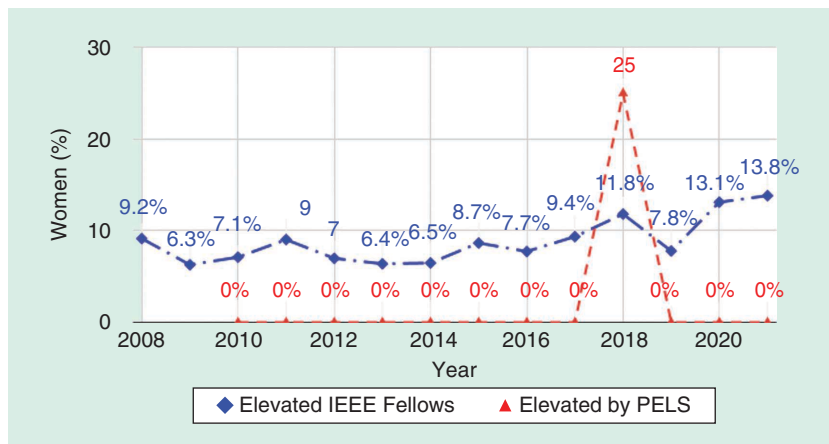


FIG 4 Comparing percentage of women Fellows elevated by PELS and IEEE from 2008 to 2020. (Source: IEEE PELS.)

more quickly toward equity in our membership. Second, PELS is lagging in representation of women members compared to sister societies like IAS and PES—particularly in the last five years. Looking at initiatives and efforts put forth by these societies may give insight into attracting more women to join and stay in PELS. Lastly, there has been better representation of women in the volunteering roles of PELS, such as Members-At-Large on AdCom, but significantly lower representation in the recognition of our women members—specifically, PELS awards and IEEE Fellow elevation. No women have yet been elected to the top PELS leadership positions, President and Vice President. This discrepancy identifies a disconnect between female members actively volunteering to “put in the work,” but not necessarily getting the same level of recognition as their male counter-

parts. PELS is examining this mismatch to further understand why these trends are occurring and how to close the gap.

The Role of PELS WIE Committee

Currently, the PELS WIE committee is made up of female PELS members from academic, research, and industrial organizations around the globe. This committee helps ensure that PELS receives diverse viewpoints and leadership to support critical membership initiatives. The PELS WIE committee’s goal is to foster an environment of diversity and inclusion where all are invited to join the conversation.

Educational & Networking Events: IEEE PELS WIE focuses on development of events that support and welcome the entire PELS community to foster an inclusive environment of learning where everyone is part of the conversation – regardless of their identity. Primarily focusing on pro-

fessional development events to support PELS members at all stages of their career, the PELS WIE committee develops events to highlight leadership and skills development opportunities. For many years, WIE has hosted breakfast events at major IEEE sponsored conferences to provide a diverse forum for networking and mentorship. Previous events have included career talks from women leaders in power electronics and discussions on career advancement. As part of the virtual ECCE 2020 program, the PELS WIE committee conducted an interactive webinar on the topic of mentors and advocacy [6]. This event is available on the IEEE PELS Resource page, providing insight on how to both be a mentor/advocate, and how to find one depending on the stage of your career. All events are open to all members of the IEEE PELS community, regardless of gender identity.



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Technical Speaker Identification: IEEE PELS WIE serves the PELS community as a resource for identification of diverse technical speakers to support various topics within the scope of PELS. If you are a PELS member or chapter leader who would like support to create a more diverse technical lecture series or to understand best-practices on how to develop inclusive events, please reach out to the IEEE PELS WIE committee via PELS@IEEE.org.

Women Fellow Nominations Tracking: The Fellow nomination process requires not only a solid application, but also strong references/endorsements, which can be challenging to navigate. For our highly-qualified women members, PELS WIE helps them to get the right resources to pursue this elevation. If you are interested in finding out more, please contact Katherine Kim at katherine.kim@IEEE.org.

What Can You Do?

If you wish to help increase D&I, the first step is to ask what are you doing to be an advocate for change? What actions can you take today to support D&I? Everyday, PELS members are faced with decisions—both large and small—which provide the opportunity to embody and embrace efforts toward diverse representation. Upon reflection, most members can honestly say they have not done anything to prevent or discourage inclusion. However, absence of action is insufficient to produce change—*intentional action is required to encourage diversity and inclusion*. When you are making plans for a PELS activity, do you actively seek and invite a broad range of people? If you plan to attend a PELS meeting, whether a local chapter meeting or an international event, do you ask a female colleague if she will be attending? Do you actively advocate for female colleagues or other underrepresented membership? If advocacy or sponsorship is a new concept to you, please watch the recent PELS WIE webinar,

or utilize the resources available on the PELS WIE page [7].

You have the power to ensure PELS is a society where all passionate engineers are welcome—regardless of gender, race, or the many other characteristics which make us all uniquely diverse. Today and each day following, you have the opportunity to be an active advocate for diversity and inclusion of all minds. Achieving our societies' D&I objectives requires the same level of diligence and rigor as the research and technology. As IEEE members, we share a common passion for learning and knowledge in the field of electrical engineering—together, we have the opportunity to Power a Sustainable Future.

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Katherine A. Kim (katherine.kim@IEEE.org) received the B.S. from the Franklin W. Olin College of Engineering in 2007. She received the M.S. degree and Ph.D. degrees from the University of Illinois at Urbana-Champaign in 2011 and 2014, respectively. She was an Assistant Professor at Ulsan National Institute of Science and Technology, Ulsan, South Korea, from 2014-2018. Since 2019, she has been an Associate Professor of Electrical Engineering at National Taiwan University, Taipei, Taiwan. She received the Richard M. Bass Outstanding Young Power Electronics Engineer Award from IEEE PELS in 2019, and recognition as an Innovator under 35 for the Asia Pacific Region by the MIT Technology Review in 2020. For IEEE PELS, she served as the Student Membership Chair in 2013-2014, PELS Member-At-Large for 2016-2018, and PELS Women in Engineering Chair in 2018-2020. Currently, she is the PELS Constitution and Bylaws Chair.

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